Structural changes and competitiveness in Spanish manufacturing industry: Analysis of some relationships*

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I.- Introduction

This paper analyses the main changes occurred in the productive structure of Spanish manufacturing industry in the last years, by relating them to variations in economic results observed therein and their realtionships. The analysis was carried out to three figures on the NACE[1] and registers variables relative to the economic structure and performance of sectors.

The hypothesis on which the analysis is based is that changes that have taken place in the productive structure are related to the performance achieved by sectors. In this work there is no intention to seek causality, but merely to establish associations by means of the analysis of ratings and correlations although in the last part of the analysis we try to give some picture of causal relationships.

This type of analysis enables to arrange industries by distinguishing the "leaders" from those whose evolution is more negative. In fact, an attempt is made to obtain a set of industrial classifications on the basis of various indicators.

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[1] Due to the lack of full information prior to 1993, with this breakdown level, the analysis was made for between 1993 and 2000.

For this purpose, first, the changes in sectors' VA share and sales are studied. Subsequently, a set of indicators of economic results was defined interrelated in such a way that the dynamic of sectors over time can be seen. Third, existing relationships are sought between the structure of sectors and their economic performance. Fourth, the competitiveness of the industry is analysed in order to know the main lacks of the industry in this field. Finally, based on the definition of composite measures, we will look at the relationships between the changes in the productive structure and the supply and demand sides.

II.- Some issues on structural change and performance

From the work done by Rosenstein–Rodan in the 40´s –in the perspective of the development theory-, there have been an important amount of studies looking at the relationships between changes in productive structure and the performance of the economies. Most of them take into account the relevance of the accumulation of capital in high productivity industries which trigger the growth of income and the positive evolution of internal and external competitiveness –Rostow (1960), critisized by Hunt (1989)-.

Regarding this aspect, it is expected that those industries based intensively on technology, and with high profitability growth, value added and turnover expand their beneficial effects over the whole economy through a high income generation. The linkages of this situation with the competitiveness may be founded in the reduction of unit labour costs and its translation to prices. In this sense, technology -in a broad view- as factor for improving competitiveness is crucial in the understanding of the structural change given that the capacity for increasing growth as well as competitiveness rest on this factor[2].

So, a realistic vision of the functioning of the economic world implies to admit the coexistence of companies, industries and countries characterized by differences in its technological and economic *performance* in relation to the technological frontier. Therefore, the existing distance between the point in which an economy or a industry is

[2] This is particularly the case of Spain –as well as other european countries-, at the beginning of the 60´s.

positioned with respect to the frontier defines the technology *gap*, i.e., the degree of technological asymmetry, that from a dynamic point of view is due to technology innovation as a mechanism for creating asymmetries and to technology diffusion as a mechanism for decreasing asymmetries or for convergence, see for this purpose, Dosi, Pavitt and Soete (1990).

One of the most interesting contributions -from the point of view of the technology *gap* theory, tackled in great detail in terms of this kind of literature- is the recognition that the technological variable can be insufficient to account for all trade flows –and other competitiveness measures-, and also that price and costs factors are also of significant interest. Hence, a contribution of both types of variables seems to be the appropriate way to understand trade behaviour of countries and sectors. In this sense, Dosi, Pavitt and Soete (1990) have shown that absolute advantages based on technology, together with those advantages related to costs, can provide a wide range of industry situations in which the relative importance of each one of the two aspects vary considerably. These authors state the following relation:

$$X_{ij} = f(T_{ij}, C_{ij}, O_{ij}) \qquad (1)$$

In which: X_{ij} is the indicator of international competitiveness of sector i in country j; T_{ij} includes technology advantages/disadvantages; C_{ij} includes costs differences -basically unit labour costs- and O_{ij} stands for industries ways of organization.

Regarding this last factor (O_{ij}), the difficulties in obtaining information have led to a lower treatment in empirical works, that have been focused in the use of different proxy variables relatives to economies of scale, the differentiation of products and to some indicators of demand[3]. Nevertheless, it is necessary to consider its importance since the fact of generating innovation is very closed related to the structure of sectors[4] -according to Schumpeter's terms- and the effects of this latter clearly affects foreign competitiveness of economies. In this vain, variables related to the value added structure, turnover of the industries, employment, productivity and profitability may play a very important role in the definition of industrial competitiveness.

[3] See Caves (1981), Bergstrand (1990) and Fonfría, Alvarez and Diaz de la Guardia (2001).
[4] See Kamien and Schwart (1982).

These variables show the internal organisation of the industries as well as the sources of growth. The relevance –relative weight and growth- of each of them in the configuration of the structure in the different industries give the basis for the analysis of the evolution and relative position of any particular industry into the whole manufacturing industry.

III.- Changes in the productive structure

After Spain's entry into the EU in 1986, there have been important changes in the productive structure of Spanish manufacturing basically as a result of: (1) the need for greater opening up to international markets, as a means to the Spanish economy's full integration into the international context, (2) the restructuring of several sectors through an industrial modernisation policy in the mid-80s, which at the end of the nineties was still taking place in industries such as shipping, mining or iron and steel; (3) the need for improvement in the productive efficiency of manufacturing in order to compete in a highly competitive market with no barriers to partners by increasing the size of firms in order to achieve economies of scale, and by improving technological capacities.

The Spanish industry has shown a growth model based on the positive evolution of productivity reducing the employment along time. This kind of growth model gives an idea of the maturity of the industry and the re-structring suffered specially from the mid 80´s untill the end of the 90´s. The final situation of the Spanish Industry after that process may be characterised by:

1.- The exploitation of scale economies by a number of manufacturing industries. This is based on the enlargement of the markets and on the re-estructuration of the manufactures mentioned. Industrial policy in these years was oriented to the financial and size reorganisation of the industry in order to get competitive advantages. However the high tech industrial sectors does not show a good trade performance because of the lack of R&D efforts.

2.- The specialisation of production in some industrial sectors as motor vehicles, paper products and printing and some branches of machinery and communication equipment.

However, the lack of big firms reduces the possibility of exploitation of scale economies needed to get competitive advantages.

3.- The growth of labour productivity over 5,1% along the period 1966-1998 for the manufacturing while for the whole economy the productivity growth was 3,7%. The branches with outstanding growth were those of high and medium technological content.

4.- The growth of investment in capital goods which is higher than the growth of the GDP in the period 1985-1996 and accounts around the 12% of the GDP. However the evolution have been negative in the last years.

5.- The opening up of the industry to international markets which growths from 20% in 1985 to more than 50% in 1999, measured by the ratio exports over GDP.

During the nineties changes in the productive structure of manufacturing were rather less drastic than in the previous decade. Nevertheless, it can be seen that some manufacturing industries have shown important changes in their structure and dynamic. In Tables 1 and 2 these changes regarding the share they have of added value are shown. The 10 sectors with the highest proportion of total VA and the 10 with the lowest proportion are shown[5].

The findings reveal a high degree of stability-which may also be due to the reduced time interval considered-among the industries of the "top ten", where just one change has been observed. In general terms, they are industries such as vehicles, chemical and pharmacy, along with other more traditional ones, which have significant weight in the VA structure. On the contrary, more than half the sectors included in the "bottom ten" are low technological content ones, that is, traditional sectors linked mainly to the textile industry which are intensive in labour. By making the same analysis with the

[5] To avoid variability problems with the information in the analysis, three-year measures 1993-95, and 1998-2000 have been taken, these being the periods compared.

TABLE 1: SHARE OF VALUE ADDED OVER TOTAL 1993-1995	
TOP 10	
dm341 Manufacture of motor vehicles	0,052
da158 Manufacture of other food products	0,051
da159 Manufacture of beverages	0,043
dg241 Manufacture of basic chemicals	0,037
dg244 Manufacture of pharmaceuticals, medicinal chemicals and botanical products	0,031
dh252 Manufacture of plastic products	0,030
de222 Printing and service activities related to printing	0,029
dn361 Manufacture of furniture	0,027
de221 Publishing	0,027
dm343 Manufacture of parts, accessories for motor vehicles	0,026
BOTTOM 10	
db183 Dressing and dyeing of fur; manufacture of articles of fur	0,001
dl333 Manufacture of industrial process control equipment	0,001
dn364 Manufacture of sports goods	0,001
de223 Reproduction of recorded media	0,001
db181 Manufacture of leather clothes	0,001
dn363 Manufacture of musical instruments	0,001
dl335 Manufacture of watches and clocks	0,001
dm355 Manufacture of other transport equipment n.e.c.	0,001
df231 Manufacture of coke oven products	0,001
df233 Processing of nuclear fuel	0,000

TABLE 2: SHARE OF VALUE ADDED OVER TOTAL 1997-2000	
TOP 10	
dm341 Manufacture of motor vehicles	0,053
da158 Manufacture of other food products	0,041
dg241 Manufacture of basic chemicals	0,037
da159 Manufacture of beverages	0,034
dh252 Manufacture of plastic products	0,034
dm343 Manufacture of parts, accessories for motor vehicles	0,031
de222 Printing and service activities related to printing	0,030
dn361 Manufacture of furniture	0,029
de221 Publishing	0,027
dg244 Manufacture of pharmaceuticals, medicinal chemicals and botanical products	0,027
BOTTOM 10	
dj283 Manufacture of steam generators, except central heating hot water boilers	0,001
db183 Dressing and dyeing of fur; manufacture of articles of fur	0,001
de223 Reproduction of recorded media	0,001
dn364 Manufacture of sports goods	0,001
dl335 Manufacture of watches and clocks	0,001
db181 Manufacture of leather clothes	0,001
dn363 Manufacture of musical instruments	0,001
dm355 Manufacture of other transport equipment n.e.c.	0,001
df231 Manufacture of coke oven products	0,000
df233 Processing of nuclear fuel	0,000

turnover variable most changes can be seen in the sectors which are in both groups. However, by means of the ranking correlation analysis a correlation has been obtained

between the arranging made with VA and that obtained with turnover of 0.89 for the first period and 0.87 for the second- both significant to 99%.

The question that arises now is if the industries of this ranking are the same of those which show the highest/lowest growth rate. In other words, are the most important manufacturing industries the most dynamic? If the answer to this question is negative then the structure and dynamics of the industries will vary and the consequencies for the evolution of competitiveness will not be positive. Table 3 shows this point. The correlation between manufacturing structure and growth is very low. In general terms the industries with higher weigh in the industrial structure –motor vehicles, food products, pharmaceuticals, printing…-, are not the most dynamic, which implies a different dynamics between supply and demand.

TABLE 3: GROWTH RATE OF VA, 1993-95 VS. 1997-2000 (%)	
TOP 10	
dl335 Manufacture of watches and clocks	163,743
dm342 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	70,590
dl311 Manufacture of electric motors, generators and transformers	63,914
de223 Reproduction of recorded media	58,776
dj285 Treatment and coating of metals; general mechanical engineering	57,936
di263 Manufacture of ceramic tiles and flags	54,625
dj284 Forging, pressing, stamping and roll forming of metal; powder metallurgy	53,063
di264 Manufacture of bricks, tiles and construction products	50,323
dj281 Manufacture of structural metal products	50,249
dk294 Manufacture of machine-tools	49,549
BOTTOM 10	
da152 Processing and preserving of fish and fish products	-2,868
dj283 Manufacture of steam generators, except central heating hot water boilers	-7,941
dl334 Manufacture of optical instruments,photographic equipement	-11,045
dm351 Building and repairing of ships and boats	-14,297
dc191 Tanning and dressing of leather	-14,313
db183 Dressing and dyeing of fur; manufacture of articles of fur	-15,411
df232 Manufacture of refined petroleum products	-17,585
dl322 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	-17,992
db181 Manufacture of leather clothes	-21,574
df231 Manufacture of coke oven products	-100,000

Regarding the similarities between VA and turnover, if the growth rate shown by both variables between the two periods considered is looked at, the profile obtained is very different. Thus, both industries with a higher growth rate and those with a low one

coincide in a small number of cases in the classification made through the two variables shown, for the group of distributions of coefficients with ranking correlations which are lower albeit significant. These findings imply that both variables reflect a similar structure with regard to the relative importance of the industries and a partly different dynamic or evolution.

IV.- Performance measures: a comparative analysis

Once the main traits of the changes in the productive structure of manufacturing were analysed, we subsequently went on to study the evolution of some results indicators. The indicators used record the following aspects:

Investment intensity[6]: Investment/Turnover
Efficiency: VA/Employment; Production/Employment; Turnover/Employment
Profitability: Profit/Turnover; VA-Personnel costs/Turnover

As in the section above, the most dynamic sectors in each of the variables mentioned have been selected, as well as the least dynamic ones, which enables a general profile of the leading sectors compared to the least developed ones to be obtained.

The findings relative to the variables mentioned are given in summary form in Tables 4 and 5. Table 4 refers to Spain and Table 5 to its relative position compared to the EU, quantified by means of a specialisation index in the form:

$$(Xi/\Sigma iX)_{Spain} / (Xi/\Sigma iX)_{UE}$$

Where i is the industry and X the variable considered.

[6] This information is only available for Spain, so it has not been considered possible to calculate it for the EU, unlike the rest of the variables used.

Table 4: Summary of the position of the top 10 and bottom 10 industries in Spain in both periods

	Stability level		Kind of industries	
	Top 10	Bottom10	Top 10	Bottom10
VA-Personnel costs/turnover	Medium	Medium	Traditional industries of low & medium tech content (beverages, cement, pulp, ceramic …)	Traditional industries of low & medium tech content (animal&vegetal oils, vehicles, footwear, weapons…)
Profit/Turover	Medium	High	Traditional industries of low tech content (cement, ceramic, beverages, toys…)	Repairing ships, weapons, vegetable/animal oils…
Investment/Turnover	Low	Medium	Motor Vehicles, aircrafts, ceramic, textiles…	Traditional industries, textiles, footwear..
Turnover/Employment	High	High	Chemicals, vehicles traditional industries…	Micellaneous
VA/Employment	High	High	Chemicals, pharmaceuticals, beverages…	Traditional industries: textile, wood, furniture, leather…
Production/ Employment	Low	Low	Chemicals, vehicles, and others…	Forniture, toys, textiles, wood products…

As is seen in Table 4 ,in general stability in the appearance of the first ten and last ten industries is medium or high, only being low in the case of the relationship between production and employment and in investment with regard to turnover. This finding indicates that there are no great changes-perhaps due to the short time frame considered-although important differences are observed between the industries found in the top ten places and those which are in the bottom ten places. Thus the chemical, motor vehicle pharmaceutical and ceramics industries are among the most representative of those found in the top ranking positions. Nonetheless, the textile, wood and leather industries and the oils, animal and vegetable fats industries appear continually among the bottom ten places in the ranking. Therefore, important differences are seen according to the type of technological content in the industries. This finding is applicable to the group of indicators used, though especially to those referring to the efficiency of the industries.

Table 5: Summary of the position of the top 10 and bottom 10 industries in Spain with relation to the EU (specialisation index) in both periods

	Stability level		Kind of industries	
	Top 10	Bottom10	Top 10	Bottom10
VA-Personnel costs/turnover	Low	Low	Medium tech industries: petroleum, nuclear fuel, ceramics, pharmaceuticals…	Medium tech industries: Building ships,TV and radio, weapons…
Profit/Turover	Low	Low	Very different industries	Pharmaceuticals, repairing ships, rubber, footwear…
Turnover/Employment	Medium	Low	Medium tech industries: Motor vehicles, vegetal/animal oils, chemicals…	Low tech industries: Textile, wood, rubber, miscellaneous
VA/Employment	Medium	Low	Medium tech industries: manufactures of petrol, aircrafts, cement, pulp,…	Low tech industries: agriculture and forestry machinery, detergents…
Production/ Employment	Low	Low	Medium tech industries: TV & radio, watches, and micellaneous	Low and medium tech industries: wood, forniture, jewellery..

As far as specialisation indices compared to the EU are concerned -Table 5- the findings show less stability in the position occupied by industries in the ranking in all the variables analysed. On the one hand, the industries are more heterogeneous, although in the top ten places medium-tech firms are usually to be found, whereas in the last ten are found basically industries with a lesser technological level. On the other hand, this result shows the importance of specialisation differences which Spain has in comparison with the EU. However, the relevance of multinational companies in some industries as well as the imports of foreign technologies gives to some of them a better profile in the efficiency indicators. This is the case of the top 10 industries with relation with the turnover/employment and VA/employment variables. So the conclusion we can draw from this point is that the foreign capital and the incorporation of foreign technologies to the manufacturing Spanish industry play a positive role in its development at least at the efficiency is referred. So the stability in the classifications –rankings- between Spanish and EU structures in this kind of industries is higher than in other cases.

In dynamic terms and for Spanish manufactures, the growth rate of variables which give an approach to economic results has been calculated, so that not only is a perspective gained of the general situation and the position of industries in the period considered,

but also it is known which ones have a higher growth capacity. The findings for the 10 industries with the highest growth and those with least can be summarised as follows:

-The coincidences in industries with most growth in most of the variables considered are fairly high. Thus, manufactures of accumulators, motorcycles, basic metals, pulp and iron are situated among the top ten industries for growth and appear fairly regularly in the variables for VA-Personnel costs/Turnover, Profit/Turnover and VA/Employment. That is they are industries with a high efficiency and profitability into the Spanish manufacturing industry.

- As for those with lower growth, the degree of coincidences is much less, though once again they are concentrated in the same variables as in the above case. Industries with the lowest growth are basically: manufacture of industrial process equipment and TV and radio.

In fact, the industries with the highest growth are to be found within those which are low and medium-tech, whereas those with the least growth are within the medium-tech ones. This finding shows one of the major weaknesses of Spanish manufactures, namely their excessive specialisation in low-tech industrial branches, whereas domestic demand –nor international one- is not oriented towards this type of industries.

This last point have been underlined by some authors –Myro (1999), among others-, and show an overspecialisation of the supply in relation to the demand. The consequences of this situation are the reduction of employment in such industries and the negative growth rates in most of the variables analysed here.

V.- Statistical analysis of the rankings

At this stage of the study the aim is to relate the productive structure with the indicators of economic performance of Spanish manufactures. For this purpose, a ranking correlation analysis has been followed which enables industries to be listed in accordance with both types of variables and the listings to be compared with each other.

The analysis contains the existing ranking correlations between Value Added and turnover and the measures of economic performance. This has been analysed in three ways .In the first of them the share of each industry in total VA and the total of turnover compared to the variables expressing economic results are correlated. In the second correlations are sought between the specialisation indices of VA and turnover with regard to the EU and those related to economic performance variables. Finally, growth rates in Spain are correlated both in proportions and indices of specialisation. The principal findings are the following:

-Correlations between the relative importance of Spanish VA and turnover vs. the economic variables are significant, both in the first and second period-Tables 6 and 7 - as far as the variables expressing productive efficiency are concerned. Besides, the VA has a positive and significant correlation with the investment/turnover ratio and in the second period with the rest of the variables. This finding shows that industries with the greatest weight both in total VA and total turnover are also those with a higher productive efficiency.

As it has been mentioned above, the role of multinational companies (MNC) in these kind of industries is the great relevance regarding this point. However, in the case of traditional industries where the share of MNC´s is lower than in high tech industries, this result may be explained by the experience and long tradition into the Spanish manufacturing of this industries –see Álvarez (2003)-.

Table 6: Spearman correlations, 1993-1995. Share of VA and Turnover vs Performance indicators. Spain

1993-1995	Value Added	Turnover
VA-Personnel costs/Turnover	0.15	0.23
Profit/Turover	0.11	-0.13
Investment/Turnover	0.28**	0.16
Turnover/Employment	0.24**	0.37**
VA/Employment	0.31**	0.34**
Production/Employment	0.26**	0.37**

**: Significant at 0,01 level
*: Significant at 0,05 level

Regarding the profitability side –VA-personnel cost/turnover and profit/turnover-, in the first period the correlations are not significant for VA neither not for turnover, but in the second period those are highly significant for VA. The explanation of this change may be due to the effects of the re-structuration policy carried out in the manufacturing industry from the mid 80´s to the mid 90´s and by the pressure of the increasing competitiveness in the industries with higher VA –motor vehicles, chemicals and pharmaceuticals and some traditional industries like textiles-.

Finally, the rank correlations related to the investment/turnover ratio are again significant only for the VA case but its significance declines from the first period to the second.

Table 7: Spearman correlations, 1998-2000. Share of VA and Turnover vs Performance indicators. Spain

1998-2000	Value Added	Turnover
VA-Personnel costs/Turnover	0.30**	0.14
Profit/Turover	0.31**	0.09
Investment/Turnover	0.24*	0.09
Turnover/Employment	0.20	0.36**
VA/Employment	0.27**	0.32**
Production/Employment	-0.48**	-0.44**

**: Significant at 0,01 level
*: Significant at 0,05 level

-With regard to the correlations in terms of growth, the findings are similar, efficiency being the basic factor in relationships with the productive structure-see Table 8-. Furthermore VA growth is also correlated with the growth of profitability, which dynamically is consistent if we start from the assumption that firms in different sectors seek to maximise profit rather than any other function.

The dynamics of the relationships obtained through the rank correlations show that turnover/employment and VA/employment are highly significant, but not the production/employment ratio. This result points out that the growth of the industries is not correlated with production but with their capacity to generate value added and to introduce products in the markets which is related with the positive evolution of the productivity. In other words, those industries with higher VA and turnover show a better

evolution of the productivity, but their production/employment ratio is not related with the growth of the industries size.

The results related to the profitability dynamics show again the strong association with VA, that is the industries which show a higher growth of VA are very similar with those more profitable. Two factors are behind this result: these industries are closed to oligopolistic structures –Buesa and Molero (1998)- and the penetration of foreign capital is higher than in other industries.

Table 8: Spearman correlations. Growth rate of VA and Turnover vs growth rate of Performance indicators. Spain

1993-95/1998-2000	Value Added	Turnover
VA-Personnel costs/Turnover	0.44**	0.11
Profit/Turover	0.48**	0.18
Investment/Turnover	0.19	0.01
Turnover/Employment	0.27**	0.48**
VA/Employment	0.46**	0.29**
Production/Employment	-0.10	-0.06

**: Significant at 0,01 level
*: Significant at 0,05 level

-The findings of the correlations of the specialisation indices compared to the EU in the two periods considered- tables 9 and 10- are very slight and are only seen in turnover. This situation indicates that greater specialisation does not imply-a priori- better economic results. Much the same can be said for the correlations stemming from growth rates-table 11-.

Table 9: Spearman correlations, 1993-1995. Specialisation Index of VA and Turnover vs Specialisation Index Performance indicators. (Relative to the EU)

1993-1995	Value Added	Turnover
VA-Personnel costs/Turnover	-0.17	-0.26*
Profit/Turover	0.13	0.03
Turnover/Employment	0.15	0.25*
VA/Employment	0.16	0.15
Production/Employment	0.15	0.25*

**: Significant at 0,01 level
*: Significant at 0,05 level

Table 10: Spearman correlations, 1998-2000. Specialisation Index of VA and Turnover vs Specialisation Index Performance indicators. (Relative to the EU)

1998-2000	Value Added	Turnover
VA-Personnel costs/Turnover	0.24	0.31*
Profit/Turover	0.08	0.06
Turnover/Employment	-0.15	-0.14
VA/Employment	0.01	-0.06
Production/Employment	-0.36	-0.31

**: Significant at 0,01 level
*: Significant at 0,05 level

This result points out the differences in specialisation between the Spanish and EU manufacturing industries and that the efficiency and profitability indicators go in very different ways. Only three variables are significant in the first period and all of them are joined to turnover. The first one is VA-personnel costs/turnover and it is negative, that is the structure of turnover of the industries is negative correlated with this factor. The second one relates to another profitability indicator –turnover/employment-, but in this case the sign is positive. The last significant correlation has to do with one efficiency indicator –production/employment-.

Table 11: Spearman correlations. Growth rate of Specialisation Index of VA and Turnover vs Specialisation Index Performance indicators.

(Relative to the EU)

1993-95/1998-2000	Value Added	Turnover
VA-Personnel costs/Turnover	-0.19	-0.16
Profit/Turover	0.02	-0.10
Turnover/Employment	0.14	-0.16
VA/Employment	0.03	-0.09
Production/Employment	0.12	0.14

**: Significant at 0,01 level
*: Significant at 0,05 level

In the second period of time the only significant correlation is the first one mentioned above, but now it shows a positive sign. This result is not easy to explain. The only possible explanation is that the evolution of the relative specialisation of the Spanish manufacturing industry as a whole tends to be more similar to the EU one, but table 11 shows no one significant rank correlation in the growth rates of the specialisation indexes.

VI.- The competitiveness matrix

The following analysis points out the more dynamic and laggard manufacturing industries in the EU market based on the competitive matrix developed by ECLAC (Economic Commission for Latin America and the Caribbean) which classifies the industries in terms of the dynamics of the market share and the demand done by each market of the exports for a country. In this case Spain.

Thus an increase in the market share of a country in a given industry, along with the growth of imports demand of that industry in a given market would create a *rising star* situation, i.e., the best possible situation. On the contrary, the worst position would stem from the decrease in the country's market shares in that industry together with a decreasing international demand, what has been called *retreats*. It is possible to characterize two mixed situations. The first drawn from an increase of market shares linked to a decrease in international demand, what in this chart has been called *declining stars*. The second, is the result from a negative dynamic penetration in markets linked to an enlargement of demand in international markets relative to the industry, called *missed opportunities*.

Therefore, each one of the industries can be classified in terms of trade development in relation to those parameters, which allows an inter-industrial comparison for different economies. This analysis links the structural change and internal performance of the industries with the external capacity for selling of them, that is, this is a complementary view of the performance. The information used is based on the Trade can (200??) data base[7].

Thus, table 12, shows the levels of competitiveness registered by the exporting industries of Spain.

The best imaginable scene refers about those situations in which some economic activities extend the market share that hold in the international market in a context in which this one is growing.

[7] Some examples of this kind of analysis can be found in Fonfría, Díaz de la Guardia and Alvarez (2002) and Diaz de la Guardia and Fonfría (2001).

Table 12: Competitiveness matrix for Spanish manufacturing industry. Main 20 industries. 1996-2000.

Industries	Market Share			Import Structure		
	1996	2000	Growth rate	1996	2000	Growth rate
RISING STARS						
351 Building and repairing of ships and boats	2,20	4,45	102,69	0,26	0,35	37,08
352 Manufacture of railway, tramway locomotives, rolling stock	3,67	5,91	61,23	0,12	0,13	10,45
244 Manufacture of pharmaceuticals, medicinal chemicals and botanical products	2,24	3,07	36,74	2,03	2,50	23,21
355 Manufacture of other transport equipment n.e.c.	10,17	13,04	28,32	0,92	1,02	11,19
354 Manufacture of motorcycles and bicycles	3,58	4,47	24,91	0,39	0,42	5,66
MISSED OPORTUNITIES						
366 Miscellaneous manufacturing n.e.c.	1,53	1,52	-0,57	0,41	0,45	9,24
312 Manufacture of electricity distribution and control apparatus	4,71	4,55	-3,24	0,52	0,55	5,67
365 Manufacture of games and toys	2,37	2,29	-3,34	0,74	0,76	2,22
341 Manufacture of motor vehicles	11,38	10,59	-6,97	5,51	5,82	5,77
192 Manufacture of luggage, handbags and the like, saddler	2,12	1,96	-7,72	0,24	0,25	2,69
DECLINING STARS						
231 Manufacture of coke oven products	0,18	0,92	405,21	0,43	0,30	-30,16
233 Processing of nuclear fuel	0,54	1,10	102,21	0,12	0,11	-7,15
242 Manufacture of pesticides and other agro-chemical products	1,88	3,42	82,02	0,23	0,20	-12,66
247 Manufacture of man-made fibres	1,55	2,77	78,19	0,04	0,03	-26,88
332 Manufacture of instruments for measuring except process control equipment	1,13	1,99	76,18	0,05	0,05	-3,31
RETREATS						
153 Processing and preserving of fruit and vegetables	16,50	16,49	-0,04	2,08	1,74	-16,33
183 Dressing and dyeing of fur; manufacture of articles of fur	1,39	1,38	-0,24	0,11	0,07	-37,98
211 Manufacture of pulpe, paper and paperboard	3,69	3,58	-2,75	0,49	0,42	-14,56
154 Manufacture of vegetable and animal oils and fats	9,13	8,68	-4,98	0,43	0,33	-23,98
193 Manufacture of footwear	6,87	6,41	-6,71	0,81	0,76	-6,11

Source: Trade Can (2002)

As a matter of fact, the ***rising stars*** of the Spanish economy were concentrated in economic activities related basically to the industry of transports (Chart 1). Thus, the external sales of *manufactures of pharmaceuticals, medicinal chemicals and botanical products* (244), *building and repairing of ships and boats* (351), *manufactures of railway, tramway locomotives, rolling stock* (352), *manufacture of motorcycles and*

bicycles (354) and *manufactures of other transport equipment n.e.c.* (355), caused that the market share maintained by the Spanish exporters was extended between 25 and 100% during the period 1996-2000, in a context in which the import market of such activities increased in proportions between 5 and almost 40%.

Nevertheless, the behavior of each sector was very different since a sector can have a great presence in the market and grow slowly and other sector can have a small presence in the market and grow very quickly. In its turn, both circumstances take place in an international market that expands to its own pace.

Thus, for example, the market share maintained by the Spanish exporters throughout the exports of *manufacture of other transport equipment n.e.c.* (355) represented 13% of European market and increased near 30% between 1996 and 2000; this circumstance took place in a context in which the market grew more than 11% in the same period. By contrast, by means exports of *building and repairing of ships and boats* (351) the Spanish presence was smaller, since it maintained 4.5% of the European market, but it had meant its duplication in a small but very dynamic international market (Table 1).

In the opposite end are the situations of ***retreats*.** This is the worse qualification than can reach an exporting sector. And since it has been indicated it consists of losing market share at the same time that the international market of that sector is contracting.

In Spain this situation affected to the exports of *processing and preserving of fruit and vegetables* (153), *manufacture of vegetable and animal oils and fats* (154), *dressing and dyeing of fur*, *manufactures of articles of fur* (183), *manufacture of to footwear* (193) and *manufacture of pulp, paper and paperboard* (211). In all those cases the presence registered by the Spanish exporters oscillated between its stagnation and a reduction above 6% and an international market of those products that registered reductions between 6 and almost 40% at the same time.

Each sector had its own evolution. Thus, the Spanish exporters of *processing and preserving of fruit and vegetables* (153) are outstanding in the European market since they maintain something plus 15% of the same one, but between 1996 and 2000 the maintained quota was stagnant. This circumstance took place under a scene in which the

size of the market was small (1.75% of the total imports) and in addition these contracted (-16%). For their part, the Spanish presence in the market of *dressing and dyeing of fur*, *manufactures of articles of fur* (183) it is very reduced (1,38%) and it continued declining, circumstance that took place in an also very small market and in recession (-38%).

The qualification of ***missed opportunity*** and ***declining stars*** was reached when market share decreased in the context of an international market in expansion or the market share increased in an international context in recession, respectively.

From the point of view of the Spanish economy, the five sectors that were classified like ***missed opportunities*** registered slight reductions of market share, and only one of them - *manufacture of motor vehicles* (341) - despite it reduction, represented more of 10% of the same one.

The presence of the Spanish economy in the European market through the sectors classified as ***declining stars***, showed that such sectors maintained small quotas of market and that some of them grew very quickly. By contrast, the international demand of these economic activities was very reduced and in addition it declined.

VII.- Analysis of the rankings obtained through composite measures

The analysis of the composite measures gives a more complete perspective of the relationships between the variables analysed before. In this sense the methodology used at this point is based on the calculation of composite indexes which allow to have a new perspective of the situation of every industry in three dimensions: the supply side, the demand side and the structural one. Additionally, the composite measures are relative to the EU market, in order to compare the position of each industry of Spain with the average of the EU. The period selected is 1996-2000. It is smaller than in the pervious analysis, give the lack of information for some variables[8].

[8] This is analysis is based on the developement done by the Hungarian team for this project.

This is a two steps analysis. In the first step we will analyse the aggregate results of the composite measures and in the second one the study will concentrate in the two groups derived from the competitiveness matrix analysis. This two stages of the analysis are complementary and give a broad and deep perspective of the relationships between the set of variables included in the study.

It is true that a short period span may be a problem in order to capture the changes in the productive structure (not in the case of changes in the demand), but the second half of the nineties in Spain have shown important changes driven by the increase of the competence of some countries as the Eastern European ones and the growing internationalisation of the Spanish economy. This last aspect is of great relevance given that the flows of FDI from Spain to the rest of the world have been higher than the entry flows for the first time in the recent economic history of the Spanish economy –see Moreno (1998)-.

The calculations are based on three steps:
- In the first one it is necessary to calculate the indexes.
- Secondly to know the growth rates of them in the period.
- Finally, to rank the industries according with the growth rates.

- The supply side indexes are the following:

1.Average growth rate of market share:

$$\text{GRt} = \frac{MS_t - MS_{t-1}}{MS_{t-1}} * \frac{S_t - EX_{t-1}}{S_t - EX_t + EXte_t} + \frac{MSe_t - MSe_{t-1}}{MSe_{t-1}} * \frac{EXte_t}{S_t - EX_t + EXte_t}$$

Being:

S: Total sales of domestic producers
MS: Market share on domestic market
MSe: Market share on EU market
EX: Total exports
EXte: Home country exports to EU

2.Growth of labour cost over sales relative to EU:

$$GRt = \frac{\frac{LC_t / S_t}{LCe_t / Se_t} - \frac{LC_{t-1} / S_{t-1}}{LCe_{t-1} / Se_{t-1}}}{\frac{LC_{t-1} / S_{t-1}}{LCe_{t-1} / S_{t-1}}}$$

Being:

LC: Total labour costs in the Spanish industries

LCe: EU total labour costs

3.Wage level relative to the EU:

Relative wage level = **RWL** = $\frac{W/L}{\Sigma W/\Sigma L}$ and the same for the EU (RWLe)

where Σ mean sum of all industries value.

Being:

W: wages and salaries without social contribution

L: Employment

Relative wage level $= \frac{RWL_t}{RWLe_t}$

4.Investment/sales (RI)

RI = ΣI/ΣS

where Σ means sum of yearly (investment or sales) figures for the whole period.

Being:

I: Investment

S: Total sales of domestic producers

For every industry there are four ranks from the supply side. Now it is necessary to calculate the value which minimize the next expression, using the value of GR for the different industries we can have our final ranking. The industry with the highest GR will get the rank 1:

$(GR-R_1)^2+(GR-R_2)^2+(GR-R_3)^2+(GR-R_4)^2$

Being:

R_i : the ranking created using by the i^{th} indicator

Y: The change in every measure

- From the demand side, the composite ranking has the following expression, similar to the supply index:

$$GRt = \frac{DD_t - DD_{t-1}}{DD_{t-1}} * \frac{S_t - EX_t}{S_t - EX_t + EXte_t} + \frac{DDe_t - DDe_{t-1}}{DDe_{t-1}} * \frac{EXte_t}{S_t - EX_t + EXte_t}$$

Similarly we have to find the X which minimize the expression:

$$(X-(GR_1+1))^2+(X^2-(GR_1+1)*(GR_2+1))^2+\ldots+(X^n-(GR_1+1)*\ldots*(GR_n+1))^2 \qquad (1)$$

Using X, it is possible to have a ranking of the industries. The industry with the highest X will get the rank 1.

- Structural indicators

1.Share in employment:

$$GRt = \frac{L_t / \Sigma L_t - L_{t-1} / \Sigma L_{t-1}}{L_{t-1} / \Sigma L_{t-1}}$$

With yearly changes, we have to find the X which minimize the expression (1).
Once again, the industry with the highest X will get the rank 1.

2.Share in Value Added:

$$GRt = \frac{VA_t / \Sigma VA_t - VA_{t-1} / \Sigma VA_{t-1}}{VA_{t-1} / \Sigma VA_{t-1}}$$

Being, ΣVA the total value added in manufacturing.
The calculation of the ranking is the same that in the last case.

Comparing the rankings of the industries obtained through the different measures explained above, the results can be summarised as follow:

1.- From the supply side perspective almost half of the industries are the same comparing the SSC indicator with the others. The coincidences are stronger between the labour costs/sales indicator and the investment/sales indicator in the case of the top ten industries. The main similarities can be found in the manufacture of man-made fibres, pulp, paper and paperboard, ceramic tiles and flags and leather clothes. These industries are of low technological content.
Regarding the bottom 10 industries, the coincidences of the SSC indicator are higher with the relative wage level. The industries included in both rankings are: manufactures of other wearing apparel and accessories, other chemical products, tanning and dressing of leather, footwear and watches and clocks. In this case the industries are mainly of medium technological content, showing one of the weakness of the Spanish manufacturing industry.

2.- Analysing the demand side, the results point out the very few coincidences with the supply side. A short number of industries are the same in both perspectives in

the top ten ranking, mainly manufactures of man made-fibres, weapons and ammunition and sawmilling and planning of wood as well as in the bottom ten: ceramics, leather and cement. This result express the wide differences between the supply and the demand side, as expressed in Fonfría, Álvarez and Díaz de la Guardia (2002). In general terms the most dynamic industries by the supply side are those of low technological content while in the demand side there are mainly medium and high technological industries.

3.- Looking at the structural indicators, the two indexes used show some differences in the top ten industries (manufactures of watches and clocks, weapons and ammunitions, structural metal products and printing), but almost no differences in the bottom ten. The most dynamic industries are of low and medium tech content which underline that the supply side and the structural indicators are more similar between them than in relation with the demand side composite measure. That is, the supply and the specialisation of the manufacturing industry show a wide difference with the demand. The main differences between the supply indicators and the structural ones can be found in the less dynamic industries for the share of value added and the labour costs/sales and investment /sales rankings showing that in that industries the growth of costs is high but the investment growths in a very low path.

VIII.- Grouping the industries: Spearman correlations analysis for the groups

The next step in the analysis is to study their main structural and performance characteristics, first for the whole industries and secondly for a group of industries,. Then we are able to suggest a cluster of industries which show some relevant differences and to analyse the existing correlations between the performance and structural profiles, based on the composites measures explained above.

Starting with the manufacturing industry as a whole, table 13 shows the average growth rate and the standard deviation of the measures explained. The dynamics of the market share is high but the deviation with relation to the average shows the diversity of behaviour in the industries considered. Something similar occurs in the cases of the structural indicators (share in value added and in employment of the industries) and in the demand side composite measure. However, in the other variables the difference between the average and the standard deviation is less than 1, so the diversity into the industries is reduced.

Table 13: Some indicators of the structural and performance measures. Spain, 1996-2000

Structural and performance measures	Average growth rate	Standard deviation
Growth rate of Market Share	3,74	28,09
Wage level relative to EU	34,36	23,29
Investment / Sales	3,28	1,28
Share in Value Added	,93	11,05
Share in employment	-,52	4,81
Suply side composite	2,13	1,71
Demand side composite	5,77	48,53

Source: Own elaboration

Specially relevant is the fact that the demand growths over the supply; it means that there is a lack of response by the supply side of the manufacturing industry to the dynamics of the markets. This argument may be reflected in the low growth of the structural indicators. So the question that arises is whether the structure of the industry is according to the demand. *A priori* the answer is negative.

However, these results are aggregate for the whole industry. A deep analysis needs to take into account some differential feature of the industries. So, splitting the industries into two groups it is possible to obtain a more accurate profile of them. The criteria used in order to obtain these groups is the export intensity. The first group is shaped by the industries which export above the average and the second by those which export below the average. Table 14 shows some characteristics of them.

Table 14: Some indicators of the structural and performance measures for groups of industries. Spain, 1996-2000

Structural and performance measures	Industries with exports above average		Industries with exports below average	
	Average growth rate	Standard deviation	Average growth rate	Standard deviation
Growth rate of Market Share	19,94	36,19	16,41	35,12
Wage level relative to EU	33,13	18,86	34,77	24,79
Investment / Sales	3,63	1,14	3,16	1,31
Share in Value Added	-,43	2,96	1,38	12,62
Share in employment	-,88	1,67	-,40	5,47
Suply side composite	1,97	,94	2,19	1,90
Demand side composite	,88	8,03	7,40	55,93

Source: Own elaboration

In general terms, the average of the growth rates of the structural indicators show a similar path except in the share in value added which is higher for the less exporter industries. So, this may indicate that these industries are growing very fast as well as the supply and demand indicators. In addition, the relative wage level growths more than in the industries that export above the average, which may points out a higher complexity in these industries.

At the same time, the demand composite measure growths much more in this case than in the case of the more dynamic exporters. The explanation to this fact is that the industries included in the less dynamic exporters group are of higher technological content (some branches of chemicals, motor vehicles and electronics), in which the international competence and the relative specialisation of Spain is been eroded along the time in some cases and in others does not exists. However, the effort to develop theses branches and the low share of some of them let them to grow rapidly.

The last step in the analysis is to look for the relationships between the different measures proposed, that is to link the structural and performance measures. With this aim we have performed a Spearman correlation analysis in order to know the associations between the variables. This has been analysed in two ways. First the variables have been compared for the whole industries to get the general pattern of the relationships. And secondly, this exercise has been repeated for the two groups exposed above.

The study for all the industries (Table 15) show that the structural indicators are highly correlated between them and with the wage level relative to the EU and the intensity of the investments. In the case of the wages, the sign is negative that is the more share in the employment of an industry the less growth of their wages. This means that the traditional industries (those with higher share in the whole industry) show a low position in the growth of their wages. This is a typical outcome given that the growth of the wages is higher in the new industries relative to the traditional ones.

Regarding the investment intensity the result is the reverse, that is, the traditional industries seems to invest more intensive than the new ones. This may be due to the growing competence of the new industrialised countries and the Eastern European

Countries, which show some similarities in their productive structure with the Spanish one.

The supply side composite shows three significant correlations, with wages and with the share of the industries in the value added and the employment. In the last two cases the sign is negative, that is the higher is the share in the industry the lower the capacity to supply the internal market. Once again, the international competition affects primarily to the traditional industries of the Spanish market .

From the demand side, there is only one significant correlation with the growth of the market. The rest of the correlations are not significant which means a kind of "divorce" between the demand and the other variables. Here arises the question about how the industries answer to the demand. In this case the answer seems to be inadequate.

Table 15: Correlation matrix. Spain 1996-2000. All industries

	Growth rate of Market Share	Wage level relative to EU	Investment / Sales	Share in Value Added	Share in employment	Suply side composite	Demand side composite
Growth rate of Market Share	**1,000**	-,097	-,245	-,149	,126	,082	**,371(*)**
	.	,476	,069	,287	,369	,548	**,018**
Wage level relative to EU		**1,000**	-,106	-,266	**-,594(**)**	**,814(**)**	-,120
		.	,439	,054	**,000**	**,000**	,378
Investment / Sales			**1,000**	**,312(*)**	,238	-,115	,138
			.	**,023**	,086	,391	,309
Share in Value Added				**1,000**	**,571(**)**	**-,301(*)**	-,059
				.	**,000**	**,028**	,673
Share in employment					**1,000**	**-,563(**)**	,087
					.	**,000**	,537
Suply side composite						**1,000**	,222
						.	,100
Demand side composite							**1,000**
							.

** Significant at 0,01 level.
* Significant at 0,05 level.

Looking at the groups analysis there are relevant differences between the two groups obtained (Tables 16 and 17). As in the case of the whole industry, the most relevant associations are with the supply side composite measure, and basically with the wages

and the productive structure indicators. The signs are the same that in the general analysis. Nonetheless the correlation with wages is higher in the case of the more dynamic exporting industries due to the weight of the salaries in these kind of industries[9].

The evidence shows that for the less exporting industries the number of significant correlations is higher than for the other group. Two main differences arises. The first one is the role played by the demand. For the industries with exports below the average the demand and supply sides are correlated, so the link does exists. The industries in this group (generally more technological developed ones) have to look for new markets and adequate their supply to a very dynamic demand, which is not the case of the traditional industries that face less rapid changes.

Table 16: Correlation matrix. Spain 1996-2000. For industries with exports above average

	Growth rate of Market Share	Wage level relative to EU	Investment / Sales	Share in Value Added	Share in employment	Suply side composite	Demand side composite
Growth rate of Market Share	**1,000**	-,358	-,468	-,319	,137	-,187	,059
	.	,208	,091	,289	,655	,523	,840
Wage level relative to EU		**1,000**	,530	,121	**-,659(*)**	**,960(**)**	-,301
		.	,051	,694	**,014**	**,000**	,296
Investment / Sales			**1,000**	**,571(*)**	-,181	,389	-,301
			.	**,041**	,553	,169	,296
Share in Value Added				**1,000**	,143	,000	,033
				.	,642	1,000	,915
Share in employment					**1,000**	**-,692(**)**	,462
					.	**,009**	,112
Suply side composite						**1,000**	-,204
						.	,483
Demand side composite							**1,000**
							.

** Significant at 0,01 level.
* Significant at 0,05 level.

The possibility of countries penetration in international markets depends on the capacity to give response to an increasingly sophisticated demand and to be focused on goods of

[9] As it has been mentioned, for the less tradicional industries wages are higher given the human capital quality, among other factors.

a high technological content, for which more developed countries compete. Is the Spanish manufacturing industry giving an answer in this sense?
The results obtained indicate that the answer is partially negative. The scarcity of relationships between the demand and other indicators is a strong evidence.

Thus, the growth of trade on manufactures has been extremely high during the last three decades, rates ranging from 10% in 1970 increasing twofold at the end of 1990s. This growth has been specially significant in relation to trade on high technology-intensive goods, which shows a special dynamic demand. The need of increasingly sophisticated goods, that accumulate a higher ratio of knowledge, with higher wages both in terms of technological and human capital means a shortcoming for some countries like Spain that is not in the frontier and is specialised in low and medium technological industries.

Table 17: Correlation matrix. Spain 1996-2000. For industries with exports below average

	Growth rate of Market Share	Wage level relative to EU	Investment / Sales	Share in Value Added	Share in employment	Suply side composite	Demand side composite
Growth rate of Market Share	**1,000**	,010	-,199	-,096	,118	,188	,020
	.	,951	,207	,555	,470	,233	,898
Wage level relative to EU		**1,000**	-,276	**-,339(*)**	**-,559(**)**	**,765(**)**	-,043
		.	,077	**,033**	**,000**	**,000**	,785
Investment / Sales			**1,000**	,280	,293	-,250	,246
			.	,080	,066	,105	,117
Share in Value Added				**1,000**	**,616(**)**	**-,321(**)**	-,115
				.	**,000**	**,043**	,480
Share in employment					**1,000**	**-,492(**)**	-,081
					.	**,001**	,618
Suply side composite						**1,000**	**,370(*)**
						.	**,016**
Demand side composite							**1,000**
							.

** Significant at 0,01 level.
* Significant at 0,05 level.

IX.- Causal analysis

As it has been pointed out at the begining of the paper, the most adequate way to analyse the causal relationships existing between competitiveness and structural change may be the technology gap approach. In this sense, the aim is to explain the industrial performance based on part of the Dosi, Pavitt and Soete (1990) expression. Then the objective is now based on the industrial structure and costs, puting aside the technological characteristics which are not the aim of this paper.

The final theoretical formula used here is the following:

$$X_i = f(C_i, O_i)$$

In which: X_i is the indicator of international competitiveness of industry i; C_i includes costs differences -basically unit labour costs- and O_i stands for industries ways of organization.

Regarding this last factor (O_i), the variables related to the value added structure, turnover of the industries, employment, or investment may play a very important role in the definition of industrial competitiveness. In other words, it is expected that the structure of the industries can play a relevant role in the explanation of their competitiveness.

The results of different empirical approaches used in studies on this relationship can be stated as follows (see Fonfría, Álvarez and Díaz de la Guardia (2002), for a review of the literature):

1.- There is a wide consensus relating to the variable approaching costs in favour of using unit labour costs -see Glejser, Jaquemin and Petit (1980)-.

2.- Some analysis have shown the relevance of the investment effort in the explanation of the industrial performance (Magnier and Toujas-Bernat (1994). This is linked to different ways of investment relating to R&D, and other phisical investments.

3.- Regarding the dependent variable linked to trade, the alternatives are several ranging from market shares to export cover rate, or to the degree of trade openness. Obviously, the decision of choosing one of these three variables is of most importance since none of them substitute the other.

In this case it has been used two different dependent variables. The first one is the export over value added which express the export intensity of the industries and the second is refferred to the capacity of the industries to entry and expand in international markets, that is the market share. Both of them reffers to the EU market.

Regarding the independent variables, the selection has been made based on the following criteria:

1.- A first set of variables which take into account the supply and demand sides that have been calculated through the composite measures explained above.

2.- Second, one variable related to the relative wheight of each industry (share in value added).

3.- The third variable reffers to the capacity of investing by industries, through the ratio between the gross capital formation and turnover.

4.- Finally, it have been taken into account the role of imports through the ratio imports/turnover. This variable is specially relevant in order to capture the "dependence" of the industry from the external trade.

The results are in table 18. It has been used a logistic regression models (see Amemiya (1981) and Hosmer and Lemeshow (1989). The dependent variables are binary and both have been calculated spliting the whole manufacturing industry above and below the average of the export intensity and the market share.

Table 18: Logistic regressions

VARIABLES	Export intensity	Market share
Gross capital formation/Turnover	-0,88 (0,00)	0,30 (0,24)
Suply side composite	-1,91 (0,36)	0,79 (0,31)
Demand side composite	0,31 (0,05)	-0,05 (0,04)
Relative wage level to EU	0,09 (0,41)	-0,04 (0,28)
Imports/Turnover	0,02 (0,00)	0,01 (0,40)
Share in value added	0,36 (0,35)	-0,34 (0,02)
Constant	-2,77 (0,00)	-1,98 (0,00)
Wald	11,97 (0,00)	9,14 (0,00)
Hosmer-Lemeshow Test	33,47 (0,00)	14,81 (0,00)
R^2 Cox-Snell	0,56	0,31
% of correctly classified cases	90,6	71,2

Note: In brakets the confidence level

The main conclusions obtained from the models can be sumarised as follows:

1.- The export intensity model fits better than the market share one. That is the variables included in the models are more adequate for explaining export intensity than market share. Regarding the export intensity model, three variables are statistically significant: the intensity of investment, the demand composite measure and the relative weight of imports on turnover.

2.- In relation with the first one this is an expected result. The most intensive industries in investment show the higher export intensity. This result is linked to the evolution of some traditional industries which have a high weight in turnover –textil-, as well as in medium technological industries as motor vehicles and more recently aeroespace, a high tech industry.

3.- The demand composite measure is highly significant in both estimates but the sign is the opposite. The positive sign of this variable means that demand affects positively the export intensity, then the industries which respond to the evolution of demand are able to increase their capacity to export. Nonetheless, those industries which does not give an answer to that evolution can not increase their market share. In this vain the increase of the export intensity in some branches does not mean the improvement of the market share of them.

4.- Contrary to the expected result, the weight of the branches on the total value added of the Spanish manufacturing industry play a significant but negative role in the explanation of the market share and not in the export intensity case. This effect explains the relevance in gaining market share of those branches which are not very representative of the Spanish manufacturing industry, that is high tech industries.

VI.- Some conclusions and policy implications

The analysis of the relationships between the evolution of the manufacturing industry and the changes in the performance indicators give some conclusions.

First, the changes in the productive structure of the Spanish manufacturing industry are not very important during the time spanconsidered. The main changes seem to be expressed more intensively measuring through VA than through the turnover variable.

Second, there are relevant differences between the more important industries in terms of their relative weigh over the manufacturing industry and those which show the most dynamic path. That is, the demand and the productive structure does not fit well. There is an overspecialisation in low tech industries but the demand for them is not growing in a similar way. Additionally, the demand and the supply are not closely connected.

Third, we have found a high stability in the rankings of the industries –top 10 and bottom 10- according to the performance indicators included in the analysis. The industries that appear more frequently in the top ten are low and medium tech ones, specially motor vehicles, chemicals and pharmaceuticals and textiles. However, this stability is reduced when comparing with the EU. This result reinforces the existing differences between the Spanish and the EU manufacturing industries. The convergence seems not to be the main characteristic in this case.

Fourth, industries with the greatest weight both in total VA and total turnover are also those with a higher productive efficiency. The re-structuration policy press to competitiveness increases in the industries with higher weight in VA.

Fifth, there are high differences in specialisation between the Spanish and the EU manufacturing industries and the efficiency and profitability indicators are very different among them.

Sixth, the competitiveness matrix reinforces the relevant role played by the medium technological industries in the Spanish international competitiveness profile. Additionally, the retreats (the industries that decrease their market share along with the decreasing of their demand in the reference market) are all of them traditional industries. This is an important change in the competitiveness of the Spanish industry in the last decades.

Seventh, the preliminary analysis of the composite measures, corroborated by the Spearman correlations, shows a break up between the supply and the demand along with a limited capacity of the industries to change their structure to compete in international markets. One of the most relevant indicators in this sense is the relative level of wages to the EU which indicates to a some extent the complexity of a particular industry.

Finally, the structural change can explain the performance of the Spanish manufacturing industry. The regression models show that the demand play a crucial role in the explanation of the competitiveness as well as the investment and the low weighted industries in the total value added.

The summary conclusion may be expressed as follows: The changes in the productive structure of the Spanish manufacturing industry goes along with positive changes in the performance of the industry but its capacity to adapt to these rapid changes of the demand is very limited. This situation may be an incentive and at the same time a shortcoming for the industry development. The international competence of some countries based in traditional industries with low salaries may be a problem for Spain as well as the low weight of high tech industries in the whole manufacrturing industry.

From the point of view of policy implications the analysis done points out some relevant aspects. Demand is crucial in the definition of the competitiveness capacity of the industry. The capacity to response to the evolution of demand is essential for

improving market share. The role of public policies may be oriented to give information about the shifts of the demand specially in medium and high tech industries. This policies should be oriented to develop high technological industries and to reinforce the modernisation of traditional ones which may be a mix that can reinforce the weak linkages between supply and demand through the generation of synergies among them.

The other field in which public policies may give some answers is in the investment path. The increase in competitiveness is based on the capacity to modernize the productive structures of the industry. This modernisation should be based on a long term investment strategies combined with a high degree of stability in industrial policies.

Finally, costs are relevant in the international trade, but this is not determinant in the competitiveness of the industry. The differences in labour costs play a role in low tech industries but investment seems to be more relevant in medium and high tech ones. The combination of inreasing higher productivity and investing (this is a virtuous circle) may be the more adequate policy mix for improving competitiveness.

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